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CENTRAL INTELLIGENCE AGENCY

WASHINGTON, D.C. 20505

9 December 1976

MEMORANDUM FOR: The Director of Central Intelligence

FROM : William W. Wells
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): Warfare Against
Enemy Radioelectronic Means During the
Initial Nuclear Strike by a Front

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article examines various electronic warfare measures which can be employed in a front operation to disrupt enemy control and warning systems and cover the front during a nuclear strike. Radioelectronic means may be destroyed by missiles, bombing and artillery, or neutralized by jamming produced by SPETSNAZ units. Coverage against strikes requires both active jamming of bombsights and the use of radar camouflage. Control of air defense may be disorganized by destroying air and missile control posts and by jamming the radars and radio communications. This article appeared in Issue No. 2 (69) for 1963.

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2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies. For ease of reference, reports from this publication have been assigned

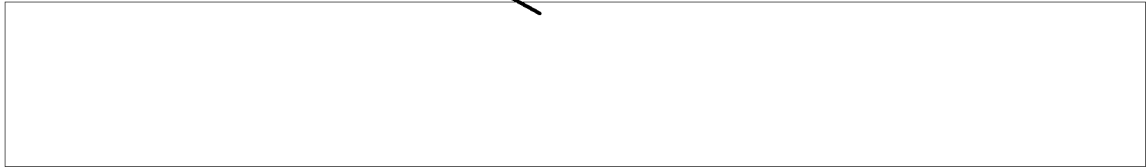
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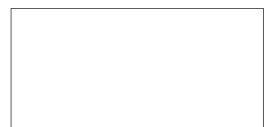
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Intelligence Information Special Report

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COUNTRY USSR

DATE OF
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9 December 1976

SUBJECT

MILITARY THOUGHT (USSR): Warfare Against Enemy Radioelectronic Means During the Initial Nuclear Strike by a Front

SOURCE Documentary
Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (69) for 1963 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The author of this article is General-Mayor of Engineer-Technical Service B. Ratts. This article examines various electronic warfare measures which can be employed in a front operation to disrupt enemy control and warning systems and cover the front during a nuclear strike. Radioelectronic means may be destroyed by missiles, bombing and artillery, or neutralized by jamming produced by SPETSNAZ units. Coverage against strikes requires both active jamming of bombsights by SPB-7 jammers and the use of corner reflectors and other radar camouflage. Control of air defense may be disorganized by destroying air and missile control posts and by jamming the radars and radio communications. Radioelectronic targets and front capabilities and methods for neutralizing them are discussed with reference to equipment presumed to be operating in US and NATO forces. The author concludes that the electronic warfare plan should be tied closely to the plan for combating enemy nuclear means and that certain technical and organizational improvements are required.

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End of Summary
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Warfare Against Enemy Radioelectronic Means
During the Initial Nuclear Strike by a Front

by
General-Mayor of Engineer-Technical Service B. Ratts

The initial nuclear strike against an enemy can be delivered by a front under various circumstances. In delivering the strike, the front must, certainly, also be ready to repulse a nuclear strike by the enemy at the same time.

In this connection, warfare against enemy radioelectronic means during the initial nuclear strike by the front will have the purpose: first, to guarantee the maximum possible effectiveness of the nuclear strike by the front against enemy troops and installations; and second, to weaken the nuclear strike by the enemy against the troops and installations of the front.

Warfare against enemy radioelectronic means can be waged by destroying them, producing jamming and by setting up radar camouflage. As is known, all of these methods of warfare are included under the term "radioelectronic countermeasures", the essence of which is interpreted differently by many comrades. For this reason, in order to more correctly reflect the essence of the problems being examined, we are going to discuss warfare against the radioelectronic systems and means of the enemy. During the initial nuclear strike, the front will perform the following tasks with regard to neutralizing the enemy's radioelectronic means:

- disorganize the control of enemy missile units and aviation that deliver strikes against the troops and installations of the front;
- provide cover for the troops and installations of the front against strikes by enemy aviation;
- disorganize the control of the enemy's air defense forces and means;

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-- disrupt the enemy's system for warning about the radiation situation.

Let us consider what is involved in these tasks and how they can be accomplished.

The disorganization of the control of enemy missile units and aviation can be executed in two ways: by destroying enemy communications centers and the organs which control and guide surface-to-surface missiles and aviation against the troops and installations of the front; and by neutralizing, by means of jamming, the control and guidance nets of the enemy missile units and aviation.

In the table below are shown the enemy missile and aviation control organs that are to be destroyed, and what forces and means are required for their neutralization. Since the disorganization of the control of enemy air defense forces and means also requires the destruction of his radioelectronic means, the table includes also the organs for controlling enemy surface-to-air guided missiles. The number of control organs given in the table corresponds approximately to the number that presently exists in the Central Army Group of the NATO countries.

The total number of radioelectronic means that should be attacked is rather large. But there is no need to destroy all of them at the same time. In each individual case, taking into account the specific situation and the forces available, we should determine the most important systems, centers, and posts, and allocate forces to destroy them. If with the initial strike we must put out of operation five or six large communications centers, eight to ten aviation control and guidance organs, five to ten surface-to-surface missile control organs (posts), and 20 to 25 surface-to-air guided missile batteries, this would require five or six nuclear warheads, 1.5 to two divisional fighter-bomber sorties, and three or four artillery battalions. Here we must point out that the control means for Corporal guided missiles and surface-to-air guided missiles are destroyed at the same time as the launchers, since they are located in the immediate vicinity of the launchers. If we exclude these means from the calculation, then three or four nuclear warheads and approximately one divisional fighter-bomber sortie would be required to neutralize the radioelectronic means.

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Radars are best destroyed by missiles with passive homing heads. Whenever the rapid location of mobile targets and the determination of their coordinates becomes an acute problem difficult to solve, homing missiles of the surface-to-surface type can increase considerably the capabilities of the front to destroy not only radiotechnical installations, but also other important targets (missile launchers) that are in the immediate vicinity of the radars and other radio-frequency emitting devices.

The task of disorganizing enemy control of missile troops and aviation can be accomplished not only by destroying his radiotechnical means, but also by jamming the control nets of the missile and aviation units and large units and the nets which guide enemy tactical fighters to our troops and installations.

Operational shortwave communications for controlling enemy aviation and missile large units and units can be neutralized by the means of the front SPETSNAZ "F" radio battalions and partly by the means of the army SPETSNAZ "A" radio battalions. The successful neutralization of these communications while the enemy is delivering his initial strike leads to late missile launchings and aircraft sorties, to the delivery of strikes against unoccupied areas or unimportant targets, to non-synchronized strikes, and in certain cases even to the disruption of strikes by missiles and aviation. If some enemy units are situated near the border, i.e., sufficiently close to the shortwave jamming means of the SPETSNAZ "A" battalions (25 to 40 kilometers), then part of these means can be used to neutralize the warning nets of the opposing troops by surface wave, and part of the means to neutralize the control nets for aviation and missile large units and units by space wave. From this follows the important conclusion that during the initial nuclear strike it is necessary to centralize control not only over the front units for jamming radio communications, but also over the army units.

For the successful execution of the task discussed above it is very important to deploy the SPETSNAZ units even in peacetime. The means of SPETSNAZ "F" radio battalions, in our view, should be deployed 150 to 250 kilometers from the state border, since, as we all know, the field intensity of a space wave reaches maximum values at distances of 300 to 800 kilometers from the jammer. When the jamming means of SPETSNAZ "F" separate radio

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battalions are so deployed, the majority of targets (enemy operational control organs) that are to be neutralized fall into the zone of maximum jamming levels. At the same time, such a deployment of jamming means will guarantee the neutralization of operational communications during the attack by the front which follows the initial strike. SPETSNAZ "A" battalions, whose means operate at short ranges, should in peacetime be deployed in the garrison area of those armies to which they should be attached according to the plan for the first operation. During the transition of the troops to increased combat readiness and the move into the departure areas of the divisions of the first echelon, as is known, the ultra-shortwave jamming companies move into these same areas, and the shortwave jamming company of the radio battalion moves into the area of the army command post.

Under modern conditions of mobile warfare, the command posts for enemy formations, large units, and missile units will frequently be deployed at a depth of 50 to 100 kilometers and more, particularly during the initial period of a war. It is not possible to neutralize shortwave, ultra-shortwave (20 to 60 MHz) and radio-relay communications at this depth with ground-based surface-wave means. The use of ultra-shortwave and shortwave means of SPETSNAZ "A" separate radio battalions can increase the jamming range (neutralization by surface wave) up to 100 to 150 kilometers, if the means are mounted in helicopters. This measure does not require any complicated technical solutions, and can be done rather easily.

Means for jamming ultra-shortwave communications can be used to jam the nets for guiding tactical fighters against our troops and installations during the repulse of the enemy's first nuclear strike. This task must be considered very important and urgent, since the tactical fighters of our probable enemies are still the primary means of delivering nuclear weapons, and the method for training them is based on the use of control centers and posts for guiding the aircraft to ground targets. These posts were widely used for guidance in the FALLEX-60 and CHECKMATE exercises of the NATO countries. In the FALLEX-60 exercise the posts were used for executing more than 100 guidances and strikes against ground targets in three days. At the guidance post, in the process of "ground-to-air" guidance, ultra-shortwave radio communications means are used first, and then the MSQ-1 radar. 50X1-HUM By jamming radio communications, we can prevent a tactical

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fighter from communicating with its control organ which assigns the fighter its task, retargets it, and also issues the commands for the approach to the target area. Without these data a modern high-speed fighter is not capable of finding and destroying a target independently. In such a case, the strike would most probably be delivered against an empty area. The ultra-shortwave band (225 to 400 MHz) can be jammed by the jammers that are part of the organic equipment of the SPETSNAZ "S" radiotechnical battalions and part of the organic training equipment of the SPETSNAZ radio battalions of an air army of a front. However, actually these jammers have not yet been issued to the troops. Experimental models have shown rather good results. As far as the MSQ-1 guidance radars are concerned, jamming them is difficult since they operate not on the principle of reflection, but on that of the re-emission of electromagnetic energy by a transponder on the aircraft. Because of this the return pulse of energy has such a high intensity that extremely powerful jammers, the development of which would be infeasible, would be required to neutralize it. Thus, it is better to neutralize the MSQ-1 radar by means of artillery and fighter-bomber fire.

The task of covering the troops and installations of the front against air strikes requires, first of all, the employment of jamming against the radiotechnical means for air navigation and bombing and, secondly, the use of passive jamming means (various reflectors) for camouflaging the troops and installations against radar observation from the air.

Those enemy aircraft that will participate in the first nuclear strike against the front's troops and installations will be tactical fighters and medium (tactical) bombers, but not excluding part of the strategic bombers. For bombing, the medium and strategic bombers use radar bombsights as an integral component of their navigation and bombing system; tactical fighters use the MSQ-1 system (American F-84, F-100; French Breguet 1100, "Talon", etc.) or even the R14A (R21A) of the NASARR system (F-104, F-105). Both the bombsights of the bombers and R14A radars, which operate in the three-centimeter band, are jammed by our SPB-7 jammers that are found in the SPETSNAZ "S" radiotechnical battalions. With better tactical characteristics and specifications than the older SPB-5 jammers, the SPB-7 jammer has a wider zone of cover of radar reference points in the area where troops and installations are deployed. We can assume that

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a jamming company of the SPETSNAZ "S" separate radiotechnical battalion will provide cover for troops and installations in a circular area 20 kilometers in radius, provided the density of the bomber attack does not exceed three aircraft per minute. Consequently, a battalion can cover an area consisting of three circles, each having a diameter of about 40 kilometers. Thus, the battalion will provide cover mainly for the main grouping of one of the armies, or for a front missile brigade and one or two of the most important installations of the front, such as the command post, front base, etc.

The above approximate norm applies for the use of jammers on semi-rugged terrain in the absence of contrasting radar reference points (large cities, characteristic bends in large rivers or coastal strips) which produce on the screens of the bombsights considerable "open" zones around a target, i.e., zones in which the aircraft crew, as they enter the zones, can begin to observe the target against the background of the jamming. To cover such targets within the air defense system of the country requires deploying around the targets a considerable number of jammers in a set arrangement.

The necessity of setting up a comparatively large number of SPB jammers to cover the troops is explained by the fact that they are inadequate: one jammer can neutralize only one bombsight at a time. The development of an automatic jammer with rapid electric frequency switching within a certain frequency range will afford the possibility of sharply reducing the number of jammers required to cover the troops and installations of a front.

The use of the SPB-7 active bombsight jammer aimed at depriving the enemy of the capability to find bombing targets must be combined with the use of radar camouflage means (corner reflectors and various screens). Camouflage is particularly important for confusing reconnaissance aircraft that use side-looking radars. It is well known how important it is to reconnoiter enemy troops in peacetime, particularly during a period of threat, so that the first strike can be delivered against targets whose locations have been precisely fixed.

Essentially, the success or failure of a first strike to a considerable degree is determined by the availability or lack of

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precise data on the location of enemy troops and installations at the moment the strike is delivered. Reconnaissance aircraft equipped with side-looking radars -- which are in service with US army mechanized and armored divisions -- even in peacetime can continuously, day and night, keep track of all movements of our troops and combat equipment to a depth of 60 to 80 kilometers while flying along the state border. There is information that the new side-looking radars have a range of up to 150 kilometers. This obliges us in our operational camouflage plans to provide for the simulation, with fixed and mobile corner reflectors, of a concentration of troops and combat equipment in areas where the situation would require them, in order to distract the enemy's attention. On the other hand, actual installations must be concealed from observation with screens. The missile launchers of front and army units should be camouflaged especially carefully during their moves to new launch areas. Wide use should be made of dummy launch areas and launchers. The utilization of folds in the terrain will be very important for concealing troops.

It is important to keep in mind that side-looking radars are installed at present by the Americans not only on aircraft of army aviation, but also on F-104 and F-105 tactical fighters. Consequently, at the beginning of combat actions we should also expect the appearance of reconnaissance aircraft even deep within our territory. In this connection, we will have to take measures to camouflage those troops and installations that are located within the operational depth.

The disorganization of the control of air defense forces and means of an enemy who is repelling a strike by the missile troops and aviation of a front is achieved by the following measures:

- by destroying the control organs of fighter aviation and surface-to-air guided missiles;
- by neutralizing air defense radar means with jamming;
- by neutralizing the radio nets controlling the air defense forces and the warning radio communications with jamming.

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The matter of destroying the air defense control organs was considered earlier.

Neutralizing air defense radar means with jamming is done by airborne jamming means that can be installed on jamming aircraft and in some units of bomber aviation, as well as on the regular aircraft of all types of aviation. In bomber aviation the jamming aircraft can be equipped with group jamming means with which they can neutralize the detection and guidance radars of fighters as well as the target indication radars for surface-to-air guided missiles. Combat aircraft from fighter, fighter-bomber and bomber aviation must have individual jamming means for jamming the guidance (automatic tracking) radars for surface-to-air guided missiles and the intercept radars of enemy fighters used to guide air-to-air guided missiles.

If the group jamming means prevent the enemy from correctly appraising the air situation and from making the correct decision regarding the use of the air defense forces and means of fighter aviation and surface-to-air guided missiles, and also prevent the guidance of fighters, then the individual jamming means will frustrate the attack by the fighters and missiles. The guidance of fighters into the attack can also be countered by jamming the fighters' radio communications and guidance network by means of jammers carried aboard jamming bomber aircraft.

With the above-mentioned jamming means, an air army will be able to negotiate the present-day air defense of the NATO countries with minimum losses and deliver an effective strike against their forces and installations. However, we must mention the fact that more should be done so that losses in aviation inflicted by enemy air defense will be reduced to a minimum.

Until recently, radars were jammed primarily by passive jamming means -- chaff. However, the neutralization of modern radars with moving-target selection (allocation) devices requires such a large quantity of chaff that it would be difficult, indeed even impossible, to find space for it on a modern aircraft. A more categorical change to active jamming means is needed, to jammers of various types and ranges. It is very important to develop homing missiles of the air-to-surface and surface-to-surface types to destroy radars having various ranges and purposes, to equip fighter-bombers with homing radars, i.e.,

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with a special receiver with which the pilot could engage an operating enemy radar or radio station and destroy it by firing its guns or launching its missiles. Such a receiver, very simple in design, would also solve the problem of night flight. At the present time the fighter-bomber can have only very limited employment at night because of the difficulties of locating targets.

The automatic jammers for jamming detection and guidance radars and surface-to-air guided missile guidance radars must be mounted on helicopters and aircraft, so that the latter can be used in standing patrol zones over our own territory 30 to 50 kilometers from the state border. The jamming from these zones will support actions by cruise missiles, fighter-bombers and reconnaissance aircraft, which have very limited individual defensive means and no group defensive means. This measure is most necessary, particularly for the reconnaissance aircraft which have the task of reconnoitering enemy missile launch areas beginning immediately after the initiation of combat actions. Reconnaissance aircraft are forced to penetrate the enemy rear singly, which puts them into a most difficult position in respect to enemy air defense. For this reason, the front must use all available means to neutralize the air defense: surface-to-surface and air-to-surface missiles, including homing missiles; strikes by fighter-bombers; jamming of enemy radars by all possible methods, including from standing patrol zones.

Finally, the problem of developing automatic jamming means which could be mounted on cruise missiles (for example on the FKR-180 front cruise missile), is urgent.

During the first nuclear strike the jamming of enemy radio communications within his networks for issuing warnings about the air and radiation situation is very important. This type of jamming is performed in the shortwave band by the means of the SPETSNAZ "F" radio battalion and, partially, the SPETSNAZ "A" radio battalion.

The disruption of the network for issuing warnings about the air situation should prevent the use of active air defense means, and also the use of passive air defense measures, by enemy forces. Disruption of the network for issuing warnings about the radiation situation includes the neutralization by jamming of the

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network for issuing warnings about the ground zeroes of nuclear bursts, the radiation levels in various areas, and the directions and rates of movement of the radioactive clouds. Neutralization of warnings on the levels of radiation can lead to a sharp increase in the effect of radiation on enemy troops because of the delay in receiving information needed to rapidly make a decision to move the troops into uncontaminated areas.

From the above it follows that warfare against enemy radioelectronic means, in its significance and in the role it plays in the front's first nuclear strike, goes beyond the limits of those technical measures that earlier made up the concept of "radioelectronic countermeasures". In our opinion, warfare against enemy radioelectronic means must be considered an essential part of combating enemy nuclear means. From this we arrive at the important conclusion regarding the necessity of closely coordinating the plan for this warfare with the overall plan for combating enemy nuclear means, rather than drawing it up in isolation from the overall plan, as is done so often.

The development of the plan for warfare against enemy radioelectronic means must be directed by the operations directorate of a front, with active participation by representatives of the rocket troops and artillery, air army, air defense troops, communications troops and engineer troops.

In the determination of targets to be destroyed or neutralized, the destruction or neutralization that will produce the required effect must be selected on the basis of careful analysis and comparison.

From what has been said above we can draw a second important conclusion, that the solution of a whole series of technical problems must be accelerated, including: developing homing missiles of different classes and purposes, ultra-shortwave (20 to 60 MHz) jammers for mounting on helicopters and used for neutralizing the ultra-shortwave communications of the enemy ground forces to a depth of 100 to 150 kilometers, ground-based automatic sets for jamming the bombsights of tactical fighters; ground-based ultra-shortwave (225 to 400 MHz) jammers for neutralizing enemy aviation guidance communications, etc.

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Finally, we must solve certain problems associated with the organization of those SPETSNAZ radio units without which the jamming equipment could not be used: aircraft, helicopter, and ground-based radio units equipped with modern jamming equipment.

The accomplishment of these tasks will facilitate the successful delivery of a first nuclear strike by the troops of a front and simultaneously weaken a strike by the enemy against our troops and installations.

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Control Organs and Radioelectronic Means in the Front Zone Subject to
Destruction and the Forces and Means Required for the
Neutralization of One Target

Control Organs (Radioelectronic Means)	Number in Army Group	Forces and Means Required for Neutralizing One Target
Large radio centers (army group, field army, allied tactical air force, tactical air army)	6 - 8	Missile with nuclear or chemical warhead, or one or two squadrons of fighter- bombers.
Control groups (posts) for the operational- tactical missiles:		
Corporal	3 - 4	Missile with nuclear warhead, or two or three flights of fighter-bombers.
Matador	5 - 6	Flight of fighter-bombers with conventional means
Lacrosse	3 - 4	Artillery battalion with conventional means of destruction
Aviation control centers and posts	8 - 10	Two or three flights of fighter-bombers with conventional means of destruction. Homing missile.
Posts for guidance of aviation (MSQ-1 radars) against ground targets	8 - 10	Flight of fighter-bombers with conventional means of destruction. Artillery battalion or battery.
Radars for detecting and spotting of nuclear artillery	10 - 12	Artillery battalion or battery
Surface-to-air guided missile control means (by the number of batteries)	30 - 50	Two or three flights of fighter-bombers with conventional means of destruction or a homing missile.

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